BC Transmission CORPORATION
Building Connections

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20 April 2010

Ms. Erica Hamilton
Commission Secretary
British Columbia Utilities Commission
900 Howe Street, Sixth Floor
Vancouver BC, V6Z 2N3

Dear Ms. Hamilton:

Re: British Columbia Transmission Corporation (BCTC)
Supplement to the Application for a Certificate of Public Convenience and Necessity (CPCN)
for the Columbia Valley Transmission (CVT) Project – Project 3698591
Toby Creek Diversion

Pursuant to the revised regulatory timetable in Commission Order G-71-10 ordering BCTC to file an update on routing alternatives by 20 April 2010, BCTC herein files the Toby Creek Diversion Supplement to the CVT Project CPCN Application.

Sincerely,

Original signed by

Janet L. Fraser
Director, Regulatory Affairs

BC Transmission
CORPORATION

Supplement to the Application for a
Certificate of Public Convenience and Necessity

COLUMBIA VALLEY TRANSMISSION PROJECT – TOBY CREEK DIVERSION

20 April 2010

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APPENDICES

1.0 BACKGROUND

As noted in BCTC's CPCN Application for the CVT Project (Exhibit B-1, filed with the British Columbia Utilities Commission on 22 January 2010), at Section 5.2.2.5, during consultation in the fall of 2009, it was highlighted that the proposed transmission line routing crossed in the vicinity of salt/mineral licks important to a small herd of mountain goats on the west side of the Toby Creek canyon. BCTC requested AECOM Canada (AECOM) to look into this issue and, if appropriate, recommend mitigation measures.

AECOM concluded that the impact on the mountain goats and their habitat would be low and suggested mitigation measures to further reduce the impact.

BCTC presented findings to a group of concerned stakeholders on 14 December 2009. The stakeholders shared their concerns about the potential for impacts to mountain goats and goat habitat through increased access to the area and predation that might result from increased open area of the ROW.

BCTC committed to review a particular alternative route which would avoid the Toby Creek crossings. This alternative route was also included in the CPCN Application for the CVT Project (Exhibit B-1). BCTC noted in the Application that evaluation of the alternative route could not be conducted until spring when access and conditions allowed. This supplementary submission presents BCTC findings with respect to the proposed alternative route.

2.0 TOBY CREEK DIVERSION ROUTE

The Toby Creek Diversion route is shown in Appendix A: Toby Creek Diversion Route Map. The route starts at the west side of the Invermere Substation (INV) and heads north-northwest. It first crosses the BC Hydro Substation access road and at about the 1 km mark, the Toby Creek Road. The route then heads north for about 500 m and then turns northwest toward Bear Mountain Forest Service Road (FSR) following a gully toward a private property. At about the 2 km mark the route turns west crossing the Bear Mountain FSR, running parallel to the road and the private parcel to the north. The route crosses Bear Mountain FSR again and continues to run parallel to and on the south side of the private parcel for another 2 km. At that point, i.e. the 4 km mark, the route intersects the original proposed corridor and turns north onto an existing right-of-way over a private property.

3.0 EVALUATION

Evaluation of Toby Creek Diversion route included the following key considerations:

(a) Technical Feasibility;

(b) Environmental Overview Assessment;

(c) Public Consultation;

(d) First Nation Consultation; and

(e) Cost.

3.1 Technical Feasibility

The route was initially evaluated based on information available including maps, then a helicopter fly over and a walk/drive through.

A new pump-station is located just north of Invermere Substation. This will be further evaluated for the presence of any underground water piping. As noted earlier the initial section of the route crosses distribution lines, BC Hydro substation access road and Toby Creek Road. Standard design and construction procedures for distribution and road crossings will be applied for this section. The route up to the private property, at the 2 km mark, generally slopes towards the east and then through a gully. In between, at about the 1.5 km mark, there is a ridge that may pose some technical challenge and would be evaluated further during the implementation phase. Other than this particular location, there are no significant challenges for either design or construction in this section of the route. There are some existing access roads and trails in the area.

As the route turns west at approximately the 2 km mark, it is initially on the side slope of a hill with the slope facing north, crossing and then running parallel to Bear Mountain FSR on the south side. The route continues west crossing Bear Mountain FSR for the second time. Standard design and construction procedures for crossing forest service roads will be applied for these crossings. The Bear Mountain FSR continues southwest;

the area between this FSR and the private property to the north is quite rugged. The transmission line route is currently proposed to transverse through this rugged area, from hill top to hill top. This rugged area may pose same challenges for design and construction and will be evaluated further during the implementation phase. At the end (at approximately the 4 km mark), the route intersects the original proposed corridor. Standard 230 kV dead-end structures will be used at this turn.

BCTC is reasonably confident that overall, the Toby Creek Diversion is technically feasible using standard design and construction methods.

3.2 Environmental Overview Assessment

AECOM conducted an environmental overview assessment of the Toby Creek Diversion consistent with the AECOM's Environmental Overview Assessment report filed as a part of the CPCN Application (Exhibit B-1, Appendix N). In its assessment of the Toby Creek Diversion route, AECOM focused on the interactions of the project on fish and aquatic habitat, wildlife and wildlife habitat, vegetation and ecosystem, socio-economic, community, land use and aesthetics. The detailed environmental overview assessment report on the Toby Creek Diversion is included in this document as Appendix B: Environmental Overview Assessment Report Addendum – Toby Creek Diversion.

As noted and illustrated in AECOM's report at Appendix B, the environmental overview assessment was conducted over a 200 m wide corridor. Following review of engineering design and terrain considerations, the route for BCTC's proposed Toby Creek Diversion as shown in Appendix A deviates slightly from the corridor at about the 2 km mark. If the final alignment falls outside the area assessed by AECOM, BCTC will ensure that an additional environmental overview assessment is conducted.

3.2.1 Assessment Methodology

The same assessment methodology was applied to this section as was applied for the assessment of the proposed route in AECOM's Environmental Overview Assessment report (Exhibit B-1, Appendix N).

3.2.2 Fish and Aquatic Habitat

There is no major water body or creek crossing impacted by the proposed route for the Toby Creek Diversion. There is a wetland located in the westerly section along the east-west corridor. It is unlikely that it is fish habitat.

Overall it is unlikely that the Toby Creek Diversion would results in significant adverse impacts to fish and fish habitat. Mitigation measures indentified in AECOM's Environmental Overview Assessment report (Exhibit B-1, Appendix N) will be undertaken in the area of the wetland.

3.2.3 Vegetation and Wildlife

The forested habitats in this region include both coniferous forest and mixed coniferous/deciduous forest and are dominated by a diverse mix of tree species including Douglas Fir (Pseudotsuga menziesii), Trembling Aspen (Populus tremuloides and Hybrid White Spruce (Picea engelmannii x glauca). Other vegetation common in the region are tall Oregon-grape (Mahonia aquifolium) and pinegrass (Calamagrostis rubescens). Also, at the westernmost location on the proposed route there is an extensive wetland, which was assessed in detail in AECOM's Environmental Overview Assessment report (Exhibit B-1, Appendix N). Near, the 90 degree turn in the proposed line there is a rocky outcrop facing the southwest.

There is only one biogeoclimatic (BEC) subzone/variant present along the proposed Toby Creek Diversion, IDFdm2 – Kootenay Dry Mild Interior Douglas Fir Variant. A description of this BEC subzone/variant is provided in AECOM's Environmental Overview Assessment report (Exhibit B-1, Appendix N).

3.2.3.1 Vegetation and Ecosystems

The Toby Creek Diversion exists within one BEC subzone/variant. This area has the potential to contain 13 different sensitive ecosystem types and 63 rare plant species. As the field assessments on the proposed diversion were conducted during the early spring, the surveyors focused on locating certain habitat types which were identified as

having a relatively higher chance of containing a rare plant species or sensitive ecosystem (i.e., wetlands, dry, exposed slopes and old forest habitats).

The two areas in the proposed diversion that may have the potential to contain rare plants based on habitat were the wetland located at the western end of the diversion and the high knoll located at the 90 degree bend. Potential impacts to sensitive ecosystems and rare plants have been rated as “moderate”. However, several mitigation measures have been identified (see Table 6-1 of Appendix B), that, if applied to these areas, will likely reduce this rating to “low”. It is recommended that a more detailed assessment for rare plants and ecosystems be conducted by a qualified professional once a final alignment is selected to ensure that impacts to sensitive ecosystems and unique habitats are minimized.

The diversion has been modified to avoid this high knoll located at the 90 degree bend (at about the 2 km mark).

3.2.3.2 Wildlife and Wildlife Habitats

Several wildlife species at risk have been documented in the area and are expected to occur within the Toby Creek Diversion study area. Overall, potential impacts to wildlife species at risk have been rated as “moderate” (potential impacts include loss of critical habitat – either from temporary displacement due to disturbance or loss due to habitat alteration, increased mortality due to increased access to the area and/or due to construction activities, and other); however, several mitigation measures have been identified to reduce this risk. These measures focus on avoidance of limited or critical habitats (e.g., wetlands and dry exposed slopes), limiting additional access to the area, and timing restrictions around the migratory bird breeding season. The assessment of potential impact and mitigation measures that were determined in AECOM’s EOA report (Exhibit B-1, Appendix N) are not altered by the results of the Toby Creek Diversion assessment.

There is no evidence that mountain goats inhabit the proposed Toby Creek Diversion study area.

3.2.4 Socio-Economic, Community, Land Use and Aesthetics

3.2.4.1 Socio-Economic/Community

The nearest communities to the diversion are Athalmer (unincorporated) and the District Municipality of Invermere. Both are located to the east of the Toby Creek Diversion. Panorama Mountain Village (ski resort) is located to the west of the study area and is the closest major destination in that direction. Invermere remains the primary service center for community, emergency and retail services south of Golden and Radium Hot Springs.

There are no changes of significance to the results identified in the main report concerning socio-economic or community values. The Toby Creek Diversion would not change or impact the local or regional demographics to a greater or lesser extent than the alternative line options.

3.2.4.2 Land Use

The Toby Creek Diversion falls within Crown land. There are no recreational campgrounds or day use areas in close proximity to the diversion. The closest public recreational entity is Lillian Lake day use area (approximately 1.3 km to the east of the study area). Barbour Lake, which is approximately 850 m to the west of the study area, has no direct public access. Land designated as Agricultural Land Reserve (ALR) coincides with approximately 54% of the Toby Creek Diversion study area, primarily overlapping with the north-south section (ALC 2010).

There is a large crag just east of Barbour Lake that is popular for rock climbing. Forestry roads wind through the study area and are used by all-terrain vehicles, snowmobilers and hikers, seemingly more popular in the northern (east-west) portion of the study area.

3.2.4.3 Aesthetics

The topographic relief in this study area varies from approximately 1,040 m near the substation to 1,180 m in the northwest. A small number of recreational cabins and dwellings exist near the study area, with the closest being two residences approximately 250 m and 350 m north of the study area limits respectively. The proposed route is located approximately 8.5 km west of Highway 95 and does not pose a significant viewshed issue for those travelling on the major route.

A number of forestry roads and backcountry trails cross the proposed diversion, with the only major road crossing the study area being Toby Creek Road to the south. A Visual Landscape Inventory (VLI) has been completed for a portion of the study area, distributed by the Ministry of Forests and Range. The VLI identifies and delineates areas of visual sensitivity near communities and near travel corridors throughout the province (GeoBC 2010). All of the Toby Creek Diversion study area north of Vantage Point #3 (see Figure 5-3 of Appendix B) has been assigned a Visual Sensitivity Class of 3 on a scale of 4, with 1 being the most visually sensitive to alteration. The remaining areas were given a classification of UA or unclassified.

The potential for visual impact along the proposed corridor is minimized by the mix of deciduous and coniferous trees that will naturally obstruct the viewshed towards the transmission line, especially when viewed as far away as Highway 95. Following a viewshed assessment in the field, there is one area of interest (in the northeast area of the diversion) with potential for moderate visual impact in the study area. All other areas visited within the study area were considered at low visual sensitivity to alteration due to the buffering tree cover, lack of viewshed exposure and overall visual impact based on the proposed line location along the corridor.

There are no official scenic lookouts that interface with the study area, which reduces the overall visual impact of the proposed route.

3.3 Public Consultation Summary

The purpose of this summary is to describe BCTC's public information and consultation activities regarding the Toby Creek Diversion for the CVT Project.

BCTC has engaged in public consultation for the Toby Creek Diversion to ensure that all interested parties and potential stakeholders were provided with the opportunity to learn of, and to obtain information, ask questions and express concerns to BCTC about the proposed Toby Creek Diversion.

The following stakeholders were contacted:

(a) Property owners and Crown tenure holders along the proposed diversion route;

(b) Area Directors of the Regional District of East Kootenay;

(c) Mayors, councillors and staff of the Town of Invermere and the Village of Radium Hot Springs;

(d) Environmental/recreational organizations and user groups;

(e) General public in the proposed diversion route study area; and

(f) Staff of the Ministry of Forests, the Ministry of Tourism, Culture and the Arts and the Ministry of Environment – all in the Invermere area.

An e-mail with a route map was distributed to all stakeholders identified above to introduce the Toby Creek Diversion and to solicit input on this proposal. A subsequent e-mail was sent to invite all stakeholders identified above to discuss BCTC's evaluation of this proposal.

3.3.1 BCTC Community Meeting (14 April 2010)

BCTC hosted a community meeting with the participants of the December 14th meeting and others who may have an interest in the Toby Creek Diversion to discuss the current

status of BCTC's evaluation. Eight people attended this meeting, among them four interveners and two private property owners in the area adjacent to the diversion.

BCTC presented the status of the evaluation, confirmed that BCTC had identified the Toby Creek Diversion as the preferred route for the 230 kV transmission line out of Invermere, and advised that BCTC would seek approval of the diversion.

There was general support for the Toby Creek Diversion by all people present at the meeting.

The issues raised by participants in the meeting and BCTC's responses are summarized in Appendix C.

3.4 First Nation Consultation

In its feedback on the EOA report submitted as a part of the CPCN Application, the KNC identified the potential effect that the proposed route may have had on the mountain goat herd in the Toby Creek area as possibly the most significant wildlife issue on the Project. The KNC requested that BCTC evaluate a diversion that would avoid the Toby Creek Crossings and the goat habitat.

3.5 Cost

The originally proposed Toby Creek Crossing route and the Toby Creek Diversion are both approximately 4 km in distance. As standard 230 kV design and construction methodology will be used for both and there are no special construction procedures or environmental mitigation measures that will be required, BCTC is confident that within the accuracy range used for the CVT Project the cost of these two route options would be the same.

Thus, overall the Toby Creek Diversion would be cost-neutral.

4.0 CONCLUSION

As stated above, the Toby Creek Diversion route has been evaluated based on technical feasibility, environmental overview assessment, public and First Nation consultation and cost, and was assigned a ranking score of between 1 and 10, with 1 being the best and 10 being worst for each of the identified criteria.

As with the Toby Creek Crossing route (submitted in the CPCN Application), the Toby Creek Diversion route has been assigned a ranking score. A comparison is set out in the table below.

Table 4-1. Comparison of Toby Creek Routes

	Criteria	Toby Creek Crossing Route	Toby Creek Diversion Route
1	Technical Feasibility	5	5
2	Environmental	6	4
3	Public Consultation	8	2
4	First Nation Consultation	7	3
5	Cost	5	5

BCTC concludes that the Toby Creek Diversion route is preferable to the Toby Creek Crossing route. Consequently, BCTC proposes to build CVT Project using the Toby Creek Diversion.

Appendix A

Toby Creek Diversion Route Map

N 5593000 N 5594000 N 5595000 N 5596000

E 562000 E 563000 E 560000 E 561000

Toby Creek

Toby Creek Rd

Barbour Lake

Approx. 4 Km

Approx. 2 Km

2L258

INV

60L270T

60L271

N 5594000 N 5595000 N 5596000 N 5597000

LEGEND

- Existing Transmission Circuit & Substation ——— INV
- Proposed 230kV Transmission Line Corridor
- ICIS Cadastral Lines
- ILRR Cadastral Lines
- City of Golden Cadastral Lines
- Property Parcel Number and Symbols 5 5 5 5 5
- Recreation Sites
- Toby Creek Diversion Route

INDEX KEY

200 0 200 400m

SCALE: 1:10000

PRODUCED BY PHOTOGRAMMETRY SERVICES, BC HYDRO
DIGITAL ORTHOPHOTO MAP

UTM ZONE 11, NAD83
BCGS REFERENCE: 82J, 82K, 82N

LIDAR ORTHOPHOTO 2009, 10CM PIXEL
BACKROUND ORTHOPHOTO 2004-2005 GOV, 1M PIXEL

NOTE:
Cadastre acquired from ICIS, use as reference only.
Accuracy unknown

ILRR parcels of all active primary and subdivision parcels of land that are or have been within the purview of the B.C. Crown Land Management program. 80% accurate, the cadastral data is captured at a 1:1 scale with the exception of unsurveyed (digitized) boundaries.

PRELIMINARY

BC Transmission Corporation

BC hydro ENGINEERING

DSGN			
INDEP CHK			
DFTG	GJB		
DFTG CHK			
INSP			
REV			
ACPT			

COLUMBIA VALLEY TRANSMISSION PROJECT

TOBY CREEK DIVERSION ROUTE

SHEET 01 OF 01

DATE APR 13, 2010 | DISTR | DWG NO CAD | R A

Appendix B

Environmental Overview Assessment Report Addendum – Toby Creek Diversion

British Columbia Transmission Corporation

Columbia Valley Transmission Project Environmental Overview Assessment Report Addendum – Toby Creek Diversion

Prepared by:

AECOM
275 – 3001 Wayburne Drive
Burnaby, BC, Canada V5G 4W3
604 438 5311 tel
604 438 5587 fax
www.aecom.com

Project Number:

60119211-14

Date:

April 2010

Statement of Qualifications and Limitations

The attached Report (the "Report") has been prepared by AECOM Canada Ltd. ("Consultant") for the benefit of the client ("Client") in accordance with the agreement between Consultant and Client, including the scope of work detailed therein (the "Agreement").

The information, data, recommendations and conclusions contained in the Report:

- are subject to the scope, schedule, and other constraints and limitations in the Agreement and the qualifications contained in the Report (the "Limitations")
- represent Consultant's professional judgement in light of the Limitations and industry standards for the preparation of similar reports
- may be based on information provided to Consultant which has not been independently verified
- have not been updated since the date of issuance of the Report and their accuracy is limited to the time period and circumstances in which they were collected, processed, made or issued
- must be read as a whole and sections thereof should not be read out of such context
- were prepared for the specific purposes described in the Report and the Agreement
- in the case of subsurface, environmental or geotechnical conditions, may be based on limited testing and on the assumption that such conditions are uniform and not variable either geographically or over time
- It is important to note that not all aspects of traditional First Nations' cultures are recorded in the anthropological and ethnohistoric literature. Additional knowledge of traditional culture and lifeways still exists in many contemporary First Nations communities. Aboriginal societies underwent significant changes as a result of their contact with Europeans, and some cultural aspects reported in the literature may not accurately reflect that culture prior to contact.

Unless expressly stated to the contrary in the Report or the Agreement, Consultant:

- shall not be responsible for any events or circumstances that may have occurred since the date on which the Report was prepared or for any inaccuracies contained in information that was provided to Consultant
- agrees that the Report represents its professional judgement as described above for the specific purpose described in the Report and the Agreement, but Consultant makes no other representations with respect to the Report or any part thereof
- in the case of subsurface, environmental or geotechnical conditions, is not responsible for variability in such conditions geographically or over time

The Report is to be treated as confidential and may not be used or relied upon by third parties, except:

- as agreed by Consultant and Client
- as required by-law
- for use by governmental reviewing agencies

Any use of this Report is subject to this Statement of Qualifications and Limitations. Any damages arising from improper use of the Report or parts thereof shall be borne by the party making such use.

This Statement of Qualifications and Limitations is attached to and forms part of the Report.

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604 438 5311 tel
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April 16, 2010

Deepak Anand
Project Manager, CVT Project
British Columbia Transmission Corporation
1055 Dunsmuir St.
PO Box 49260
Vancouver, BC

Dear Mr. Anand:

Project No: **60119211-14**

Regarding: **Columbia Valley Transmission Project**
Environmental Overview Assessment
Report Addendum – Toby Creek Diversion

Please find attached our addendum report to AECOMs Columbia Valley Transmission project Environmental Overview Assessment. This addendum should be read as a subset of the main report. This addendum focuses on the environmental and socioeconomic features potentially impacted by the Toby Creek Diversion of the proposed CVT project.

As you know this route would avoid the issues on mountain goats (as identified in the EOA Report Addendum – Mountain Goats) located on the west side of Toby Creek so there are some obvious advantages from that standpoint. This proposed route intersects quite a steep landform and on that landform there is potential for some rare species of plants, unfortunately our ability to confirm the presence or absence of rare plants at his time of year prevents a solid foundation for making a prediction on impacts. In that light, we recommend that you review this corner of the route to determine if there are lower elevation less specific habitats to route the line. We would happy to discuss this issue with you.

In summary, neither the Toby Creek Diversion or the alternate route is likely to result in significant environmental effects after proposed mitigation.

I hope that this review is helpful.

Sincerely,
AECOM

Brad J Parker
Practice Lead, Impact Analysis and Approvals
Environment
Brad.parker@aecom.com

BJP:gc

AECOM Signatures

Report Prepared By:

Jennifer Sarchuk, Biologist

Report Prepared By:

Mike Morellato, Environmental Planner

Report Reviewed By:

Brad Parker, Practice Lead, Impact Analysis and Approvals

Report Reviewed By:

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Sean Sharpe, MSc., BSc., RP Bio	Report Writing / Senior Review
Jennifer Sarchuk. B.Sc., Dip. T.	Field Work/Report Writing
Mike Morellato, B.A., M.Sc.	Field Work/Report Writing

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Appendices

1. Introduction

BC Transmission Corporation (BCTC) is investigating options for upgrading the electrical transmission system between the District of Invermere and the Town of Golden in south-eastern British Columbia (BC). The proposed Columbia Valley Transmission (CVT) Project (the Project) involves the construction of a new 230 kV transmission line between Invermere Substation, and Kicking Horse Substation to be location on the west side of the Columbia River near town of Golden.

In the fall of 2009, AECOM prepared an Environmental Overview Assessment for the Columbia Valley Transmission project. Phase I and Phase II Environmental Overview Assessment reports were completed by AECOM (2009) that provided environmental and socio-economic information relevant to the construction and operation of the Project. The objectives of the Phase II assessment was to identify whether, taking into account mitigation, developing the CVT Project using any of the corridor options or substation sites that were identified at the time would result in significant adverse effects on the natural and socio-economic environment. The Phase II Environmental Overview Report shall be referred to in these documents as the “main report”. This report is an addendum to the main report.

In March 2010, BC Transmission Corporation provided AECOM with an alternate alignment option (Toby Creek Diversion) that is approximately 4 km long located at the southern end of the proposed transmission corridor (Figure 1-1). BCTC requested AECOM conduct environmental studies of the new corridor in line with those undertaken for the other corridor options described in the main report. AECOM has undertaken those studies, modified by seasonal conditions, and the results of those studies are provided in this addendum report.

The purposes of this assessment are the same as those provided in the main report. AECOM focused on fish and aquatic habitat, wildlife and wildlife habitat, and vegetation and ecosystems. Specific objectives of the assessment are the same as those defined in the main report.

Neave Creek
PD24609
92951
58973
PD24623
PD24606
Bear Mountain FS Road
41803
Barbour Lake
PD67629
PD24746
Toby Creek Rd.
89360
Lanaci Rd.
92864
68177
92954
Hydro Substation Rd.
67157 67050
Substation
89094
Toby Creek
PD67630
PD24737
PD24736
PD24735

Legend

- Water License Points of Diversion
- Groundwater Wells
- Salt/Mineral Licks
- Goat Access Trail
- Toby Creek Diversion
- Potential Corridor
- Existing Line
- CVT Study Area
- Trails and Roads
- Watercourse

Topography

- Contour (Index 100m)
- Contour (Interm. 20m)

Basemapping from TRIM, GeoBC, 2009. Imagery from GeoBC mosaic, 2004. All other data, AECOM, 2009.

N W E S

0 100 200
Meters

1:12,500

UTM Zone 11N, NAD 83

BC Transmission CORPORATION

CVT Project

Toby Creek Diversion with Wells and Points of Diversion

April 2010

AECOM

Figure 1-1

Project: 60119211
Prepared by: MM
Date Revised: April 12, 2010
File Location: E:\GIS\GIS_proj\Y2010\60119211_CVT_BCTC\By1_Goat_Diversion\60119211_By1_Goat_Overview_11x17_10Apr12.mxd

2. Project Description and Location

The Toby Creek Diversion is shown in Figure 1-1. The new corridor option will be cleared and constructed in the same manner as other components of the project as described in the main report. The addendum field investigations for this area focused on the proposed diversion corridor.

2.1 Assessment Methodology

2.1.1 Desktop Review

As part of the Phase I Environmental Overview Assessment conducted for the entire Columbia Valley Transmission Project, a desktop assessment of existing information related to fish and aquatic habitat, wildlife and wildlife habitat, vegetation and ecosystems, land use and aesthetics, socio-economic and community resources, and archaeological resources in the project study area was conducted. The proposed Toby Creek Diversion falls within the corridor assessed during Phase I on the Columbia Valley Transmission Project. Information sources used in the earlier assessments were reviewed and incorporated into the assessment of the Toby Creek Diversion.

2.1.2 Field Survey

In addition to the desktop analysis, a ground survey of the proposed Toby Creek Diversion was conducted by AECOM on March 31 and April 1, 2010. Because of the overlap with previous work done for the EOA of the original alignment, the field study focused on a 200 m wide corridor along the diversion route. During the field assessment specific areas were selected for assessment to get a representative sample of the area.

A description of the survey methodology and results for wildlife, wildlife habitat, sensitive ecosystems is provided in Appendix A. Because of the time of year the field survey was conducted at an overview level. The season and weather conditions for this assessment were not conducive to a full-fledged field program. Field assessments included looking at areas of interest such as high value habitats and ecosystems – wetlands and rocky outcrops. However, identifying rare plants, invertebrates, amphibians and reptiles was considered to be of little value in adding to our understanding of the existing environment due to the very early spring conditions. Plant growth had not yet begun and invertebrates, amphibians and reptiles were not yet out of winter hibernation.

A visual impact/aesthetics assessment was also undertaken in the field, focusing on viewsheds originating inside and outside of the Toby Creek Diversion. Details on the methods used and final results are included in Section 5. This component of the field survey was assessed at regular intervals throughout the study area.

An archaeological overview assessment was not undertaken because the main report has already concluded that an archaeological impact assessment is required..

2.1.3 Impact Rating

The potential impacts of the proposed Toby Creek Diversion were rated using the same rating scheme as the main report. Ratings of ‘No Impact’, ‘Low’, ‘Moderate’ or ‘High’ were determined based on the geographic extent, duration, frequency, reversibility and magnitude of the potential effect. These ratings are defined as follows:

- **‘No Impact’:** No Impact;
- **‘Low’:** Impact is low in magnitude, short in duration (construction only), reversible, limited in extent;
- **‘Moderate’:** Impact is moderate in magnitude, medium in duration; and
- **‘High’:** Impact is high in magnitude, long in duration, irreversible and broad in extent.

For further information on the rating scale, refer to the main report.

3. Fish and Aquatic Habitat

3.1 Results

3.1.1 Fish and Fish Habitat

The TRIM data shows some small watercourses in the Toby Creek Diversion area; however, during ground assessments no visible creek channel was found. There is a wetland located to the westerly section along the east west corridor but it is unlikely that this is fish habitat.

3.1.2 Groundwater Well and Surface Water Intakes

According to Environment Canada spatial data (2009), there are 10 groundwater wells that exist in close proximity (~1 km) to the Toby Creek Diversion, which can be seen in Figure 1-1. These are all classified as domestic with the exception of one (listed as unknown). Two of these wells are utilized by BC Hydro at the Invermere substation.

There are nine surface water points of diversion (POD) that exist in relatively close proximity to the Toby Creek Diversion which can be seen in Figure 1-1 along with their associated tag identifications. These PODs source Neave Creek, the Neave Creek North Fork, Barbour Lake, Toby Creek, Dufy Swamp, Ernest Brook and Boker Brook.

3.2 Discussion

There does not appear to by any fish bearing habitats within 200 m of the Toby Creek Diversion. Mitigation measures covered in the main report will be applied to the wetland.

4. Vegetation and Wildlife

4.1 Results

The proposed Toby Creek Diversion is situated near the existing Invermere substation near the District of Invermere. The forested habitats include both coniferous forest and mixed coniferous/deciduous forest and are dominated by a diverse mix of tree species including Douglas Fir (*Pseudotsuga menziesii*), Trembling Aspen (*Populus tremuloides* and hybrid white spruce (*Picea engelmannii x glauca*). Other vegetation common in the region are tall Oregon-grape (*Mahonia aquifolium*) and pinegrass (*Calamagrostis rubescens*). Also, at the western most location on the proposed route there is an extensive wetland, which was looked at in detail in the main report. Near, the 90^{o} turn in the proposed line there is a rocky outcrop facing the Southwest. See Appendix D for photos of the habitat at various locations throughout the proposed Toby Creek Diversion.

There is only one biogeoclimatic (BEC) subzone/variant present along the proposed Toby Creek Diversion, IDFdm2 – Kootenay Dry Mild Interior Douglas-fir Variant. A description of this BEC subzone/variant is provided in the main report.

4.1.1 Provincially Red- and Blue-listed Plant Species

Based on the previously compiled lists of provincially red- and blue-listed plant species potentially located within the local BEC subzones (see Appendix B), there are 63 listed species potentially located within the proposed Toby Creek Diversion; of these, 32 are blue-listed and 31 are red-listed. In the main report, habitats identified as having a relatively high potential to support rare plant species included wetlands, old forest stands, and talus slopes; these

same habitat types are likely to have a high potential for rare plant species within the Toby Creek Diversion study area. Most of the route for the proposed Toby Creek Diversion consists of disturbed forest habitats; however, there is a wetland at the very western end of the west east corridor and a rocky outcrop at the 90° bend. Both the wetland and the rocky outcrops have a relatively high potential for rare plant species compared to the surrounding young and mature forests.

4.1.2 Provincially Red- and Blue-listed Ecosystems

The following table (Table 4-1), extracted from the main report, provides a list of 13 sensitive ecosystems (seven blue-listed and six red-listed) potentially located within the BEC zone for the proposed Toby Creek Diversion. Of these, half are forested ecosystems and half are wetland and/or grassland ecosystems.

Table 4-1. Sensitive Ecosystems (Provincially Red- or Blue-listed) Potentially Occurring within the Study Area

Sensitive Ecosystems	Scientific Name	Common Name	Habitat	BC Status	Endemic (Y or N)
IDFdm2/06	*Betula nana/Eqisetum spp.*	Scrub birch/horsetail	Shrub, Riparian	Blue	N
IDFdm2/Wf05	*Carex alsiocarpa / Drepanocladus aduncus*	Slender sedge / common hookmoss	Wetland, Herbaceous	Blue	Y
IDFdm2/Gs04	*Deschampsia cespitosa* Community	Tufted hairgrass Community	Herbaceous, Grassland, Wetland	Blue	N
IDFdm2/Wm02	*Equisetum fluviatile – Carex utriculata*	Swamp horsetail – beaked sedge	Wetland, Herbaceous	Blue	N
IDFdm2/Gs03	*Juncus balticus – Carex praegracilis*	Baltic rush – field sedge	Wetland, Herbaceous	Blue	N
IDFdm2/01	*Pseudotsuga menziesii / Calamagrostis rubescens – Linnaea borealis*	Douglas-fir / pinegrass – twinflower	Forest	Blue	N
IDFdm2/Wm05	*Typha latifolia* Marsh	Common cattail Marsh	Wetland, Herbaceous	Blue	N
IDFdm2/07? (IDFdm2/05)	*Picea engelmannii x glauca – Populus tremuloides / Aralia nudicaulis*	hybrid white spruce – trembling aspen / wild sarsaparilla	Forest	Red	N
IDFdm2/?? (IDFdm2/04)	*Pseudotsuga menziesii – Larix occidentalis / Calamagrostis rubescens*	Douglas-fir – western larch / pinegrass	Forest	Red	N
IDFdm2/?? IDFdm2/03	*Pseudotsuga menziesii / Symphoricarpos albus / Balsamorhiza sagittata*	Douglas-fir / common snowberry / arrowleaf balsamroot	Forest	Red	N
IDFdm2/Gs02	*Puccinellia nuttalliana – Hordeum jubatum*	Nuttall's alkaligrass foxtail barley	Herbaceous, Wetland, Grassland	Red	N
IDFdm2/Ro? (IDFdm2/02)	*Purshia tridentate / Pseudoroegneria spicata*	Antelope-brush / bluebunch wheatgrass	Shrub, Grassland, Herbaceous	Red	N
IDFdm2/00?	*Western snowberry – Idaho fescue*	Purshia tridentate/ Pseudoroegneria spicata	Shrub, Grassland, Herbaceous	Red	N

Source: BC Ministry of Environment - BC Species and Ecosystem Explorer (BC MOE 2009)
Note: Dash indicates no data, question marks indicate that the site series label is not certain or unknown due to recent updates to the ecosystem units potentially found in the vicinity of the study area.
**BEC subzone/site series labels in brackets indicate old label (still referred to as old labels in the BC Species and Ecosystem Explorer database).*

4.1.3 Invasive Species

The invasive species listed in the main report, particularly those listed in Tables 6-6 and 6-7, also have the potential to occur on the Toby Creek Diversion. As discussed in the main report, impacts associated with the project on the spread of invasive species can likely be reduced to low by following standard Best Management Practices for managing invasive species such as removing plants, plant parts and seeds from personal gear, equipment, vehicles (see Appendix C-6 of the main report for further details).

4.1.4 Wildlife

A list of potential wildlife species at risk for the proposed Toby Creek Diversion was compiled by taking the species list from the main report and eliminating those species not found within the IDFdm2 BEC subzone/variant. The resulting list is provided in Appendix C and consists of 23 invertebrates, seven amphibians/reptiles, 23 birds and six mammals. The main report also looked at the likelihood of these species at risk being present within the original proposed corridor. The Toby Creek Diversion is located near and within the other corridor options and is within the same or similar habitat types; therefore, the original assessment of the species likely to be present is believed to be accurate for the Toby Creek Diversion as well.

As noted in the main report, badger dens (not currently occupied) were found at the south end of the line, in the vicinity of existing Invermere substation. During the field sampling program for the Toby Creek Diversion, no dens or badgers were seen; however, as noted in the main report this area is considered highly suitable habitat for badgers, with appropriate soils and low slope steepness, open forest combined with openings and abundant prey items (primarily Columbia ground squirrels). The Toby Creek Diversion is situated in an area that has the potential to contain 59 different wildlife species at risk (including invertebrates, amphibians, reptiles, birds and mammals).

The wetland located to the west is fairly low in potential as there is limited/no standing or flowing water. Because of the surrounding open forest, it may have value for summer thermal cover and nesting in the trees on the margin. It has limited potential for aquatic birds and damselflies/ dragonflies; however, it may be moist enough for salamanders and toads.

Vegetation and Wildlife-related photos associated from the aerial survey are provided in Appendix D.

4.2 Effects Assessment

4.2.1 Vegetation and Ecosystems

The Toby Creek Diversion exists within one BEC subzones/variants. This area has the potential to contain 13 different sensitive ecosystem types and 63 rare plant species. Field assessments on the proposed Toby Creek Diversion were conducted during the early spring; therefore, very little plant growth and wildlife were observed. Instead, surveyors focused on locating certain habitat types which were identified as having a relatively higher chance of containing a rare plant species or sensitive ecosystem (i.e., wetlands, dry, exposed slopes, and old forest habitats). The two areas in the proposed Toby Creek Diversion that may have the potential to contain rare plants based on habitat were the wetland located at the western end of the diversion and the high knoll located at the 90^{o} bend. In the absence of mitigation, potential impacts to sensitive ecosystems and rare plants would be rated as “moderate”. However, several mitigation measures have been identified (see Table 6-1), that, if applied to these areas, will likely reduce this rating to “low”. It is recommended that a more detailed assessment for rare plants and ecosystems be conducted by a qualified professional once a final alignment is selected to ensure that impacts to sensitive ecosystems and unique habitats are minimized.

4.2.2 Wildlife and Wildlife Habitats

Several wildlife species at risk have been documented in the area and are expected to occur within the study area. In the absence of mitigation, potential impacts to wildlife species at risk would be rated as “moderate” (potential impacts include loss of critical habitat – either from temporary displacement due to disturbance or loss due to habitat alteration, increased mortality due to increased access to the area and/or due to construction activities, and other); however, several mitigation measures have been identified to reduce this risk. These measures focus on avoidance of limited or critical habitats (e.g., wetlands and dry exposed slopes), limiting additional access to the area, and timing restrictions around the migratory bird breeding season. The potential impact levels and avoidance measures that were determined in the original report were not altered following the Toby Creek Diversion assessment.

There is no evidence that mountain goats utilize lands within the proposed Toby Creek Diversion route.

5. Socio-economic, Community, Land Use and Aesthetics

5.1 Results

5.1.1 Land Use

The Toby Creek Diversion falls within Crown Land. The diversion avoids passing over Toby Creek (twice) and also avoids passing through privately held land that would occur with the alternate alignment option. There are no recreational campgrounds or day use areas in close proximity to the study area. The closest public recreational entity is Lillian Lake day use area (~1.3 km to the east of the study area). Barbour Lake is ~850 m to the west of the study area but falls within privately-held land with no direct public access. The Diversion, does cross land designated as Agricultural Land Reserve (ALR), primarily overlapping with the north-south section (ALC 2010).

There is also a large crag just east of Barbour Lake that is popular for rock climbing. Forestry roads wind through the study area and are used by all-terrain vehicles, snowmobilers and hikers, seemingly more popular in the northern (east-west) section of the Toby Creek Diversion.

5.1.2 Visual Impact and Aesthetics

The Toby Creek Diversion is located at the southernmost extent of the proposed 230kV transmission line, west of Invermere. The topographic relief in this study area varies from approximately 1,040 m near the substation to 1,180 m in the northwest. A small number of recreational cabins and dwellings exist near the study area, with the closest being two residences approximately 250 m and 350 m north of the study area limits respectively. The proposed line is located approximately 8.5 km west of Highway 93/95 and does not pose a significant viewshed issue for those travelling on the major route. Due to this, the aesthetics assessment was focused on localized visual impact.

A number of forestry roads and backcountry trails cross the proposed diversion, with the only major road crossing the diversion being Toby Creek Road to the south. In the areas where the line interfaces with roadways there will be an increase in visual impact, but this is not considered to be a significant factor relative to the alternative line options and associated road crossings. A Visual Landscape Inventory (VLI) has been completed for a portion of the study area following standards set by the Ministry of Forests and Range. The VLI identifies and delineates areas of visual sensitivity near communities and near travel corridors throughout the province (GeoBC 2010). All of the Toby Creek Diversion north of Vantage Point #3 (see Figure 5-3) has been assigned a Visual Sensitivity Class of 3 on a four point scale, with 1 being the most visually sensitive to alteration. The remaining areas were given a classification of “UA,” or unclassified.

The potential for visual impact along the proposed corridor is minimized by the mix of deciduous and coniferous trees that will naturally obstruct the viewshed towards the transmission line, especially when viewed as far away as Highway 93/95. Following a viewshed assessment in the field, there is one area of interest (in the northeast) with potential for moderate visual impact along the Toby Creek Diversion. This area (surrounding Vantage Point #1) is discussed further below. All other areas visited along the proposed route considered at low visual sensitivity to alteration due to the buffering tree cover, lack of viewshed exposure and overall visual impact based on the proposed line location along the corridor.

To assess visual impact, viewshed assessment was undertaken from inside and outside of the study area. The field team stopped at regular intervals and documented viewsheds by noting any obvious visually exposed areas and analyzing these as vantage points. The direction of the photograph from vantage points within the study area were marked with a compass bearing, with horizontal swath and visual impact also noted. Visual impact is based on the sensitivity of altering the area surrounding the documented vantage point. There are no official scenic lookouts that interface with the study area, which reduces the overall visual impact of the proposed route.

Vantage point #1 and its associated view are shown in Figure 5-1. It is located on the top of a knoll on the northeast corner of the Toby Creek Diversion (562237E, 5595682N). The panoramic view depicted in this figure was centred at a bearing of 196 degrees, at an elevation of 1,162 m. The existing transmission line that begins at the Invermere Substation is in clear view, as well as the substation itself. The existing lines and substation can be seen in Photo 5-1.

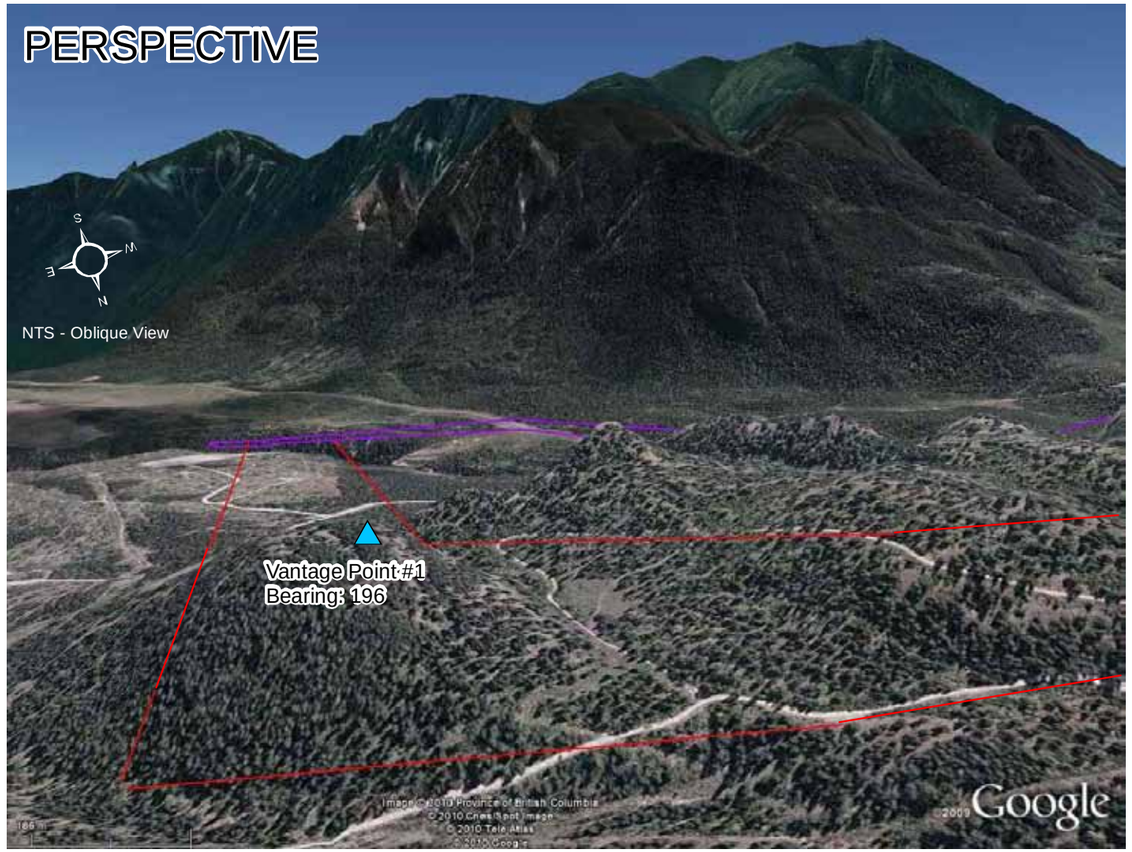
Photo 5-1. Existing Invermere substation and transmission lines near Toby Creek as seen from Vantage Point #1

This vantage point and surrounding knoll area would be exposed mainly to nearby residents and from recreational users of the area (i.e., all terrain vehicle use, backcountry road users and hikers in the area).

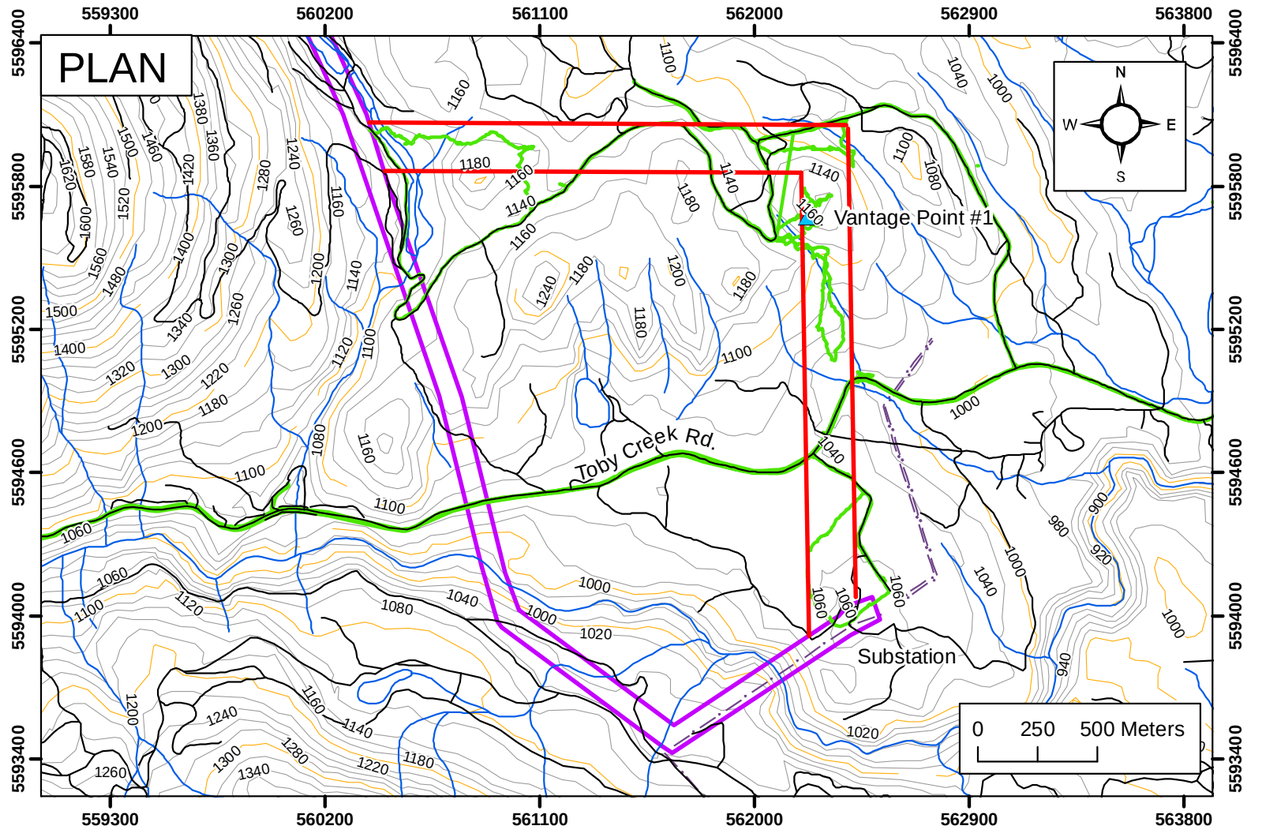
Vantage point #2 and its associated view are shown in Figure 5-2. This is located in an elevated knoll area along the Toby Creek Diversion to the northwest (561069E, 5595965N). The panoramic view shown this figure was centred at a bearing of 21 degrees, at an elevation of 1,162 m (equal in elevation to the first vantage point). One of the closest dwellings to the study area is visible from this vantage point, and can be seen in a close up view in Photo 5-2.

Photo 5-2. Residence to the north of the study area limits as seen from Vantage Point #2

PERSPECTIVE



PLAN



VIEWSHED

Imagery extracted from Google Earth Pro, associated providers Province of British Columbia, Cnes/Spot Image and TeleAtlas 2010. Image date March, 2004. All other data, BC Hydro, 2010.

Legend

- Toby Creek Diversion Boundary
- Trails and Roads
- Tracks (Mar 31, Apr 1)
- Watercourse
- Potential Corridor
- Existing Line
- Contour (Index 100m)
- Contour (Interm. 20m)

BC Transmission Corporation

CVT Toby Creek Diversion

Vantage Point #1 - Viewshed

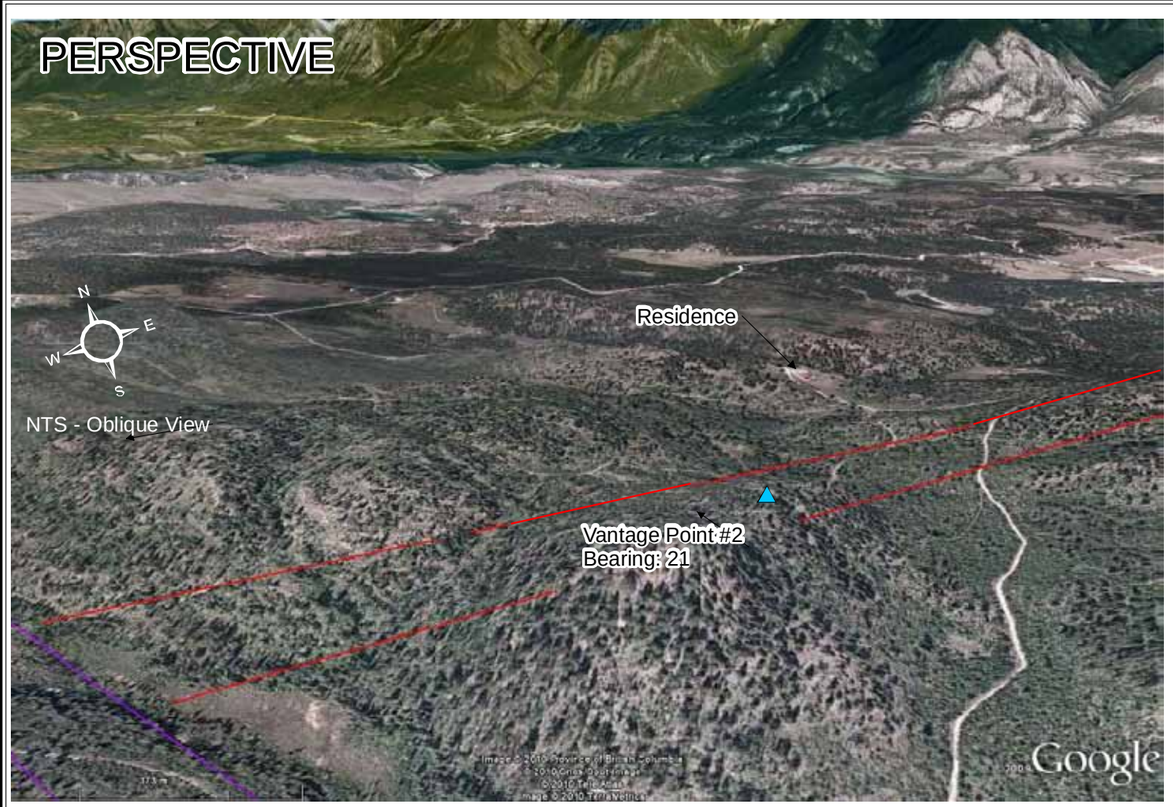
April 2010

AECOM

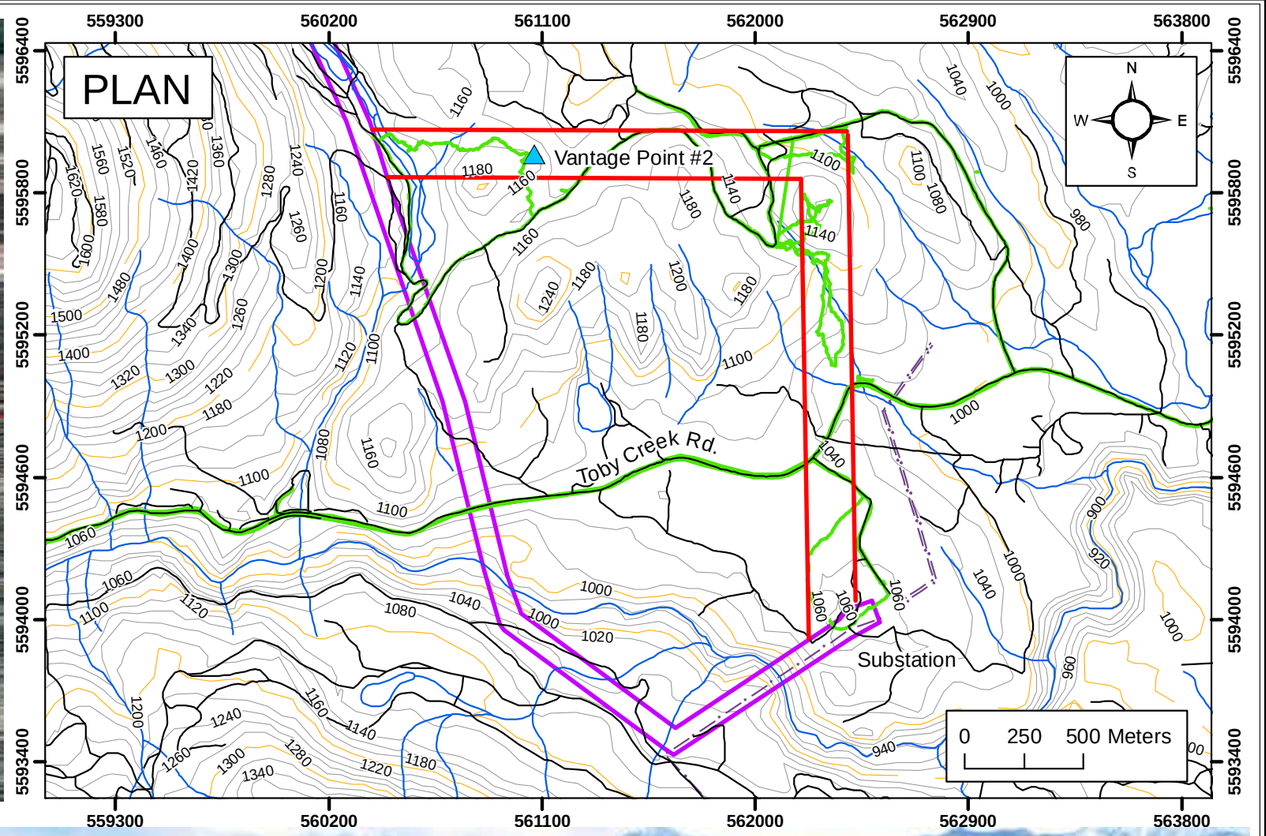
Figure 5-1

Project:
Prepared by: MM
Date Revised: April 9, 2010
File Location: E:\GIS\GIS_proj\Y2010\60119211_CVT_BCTC\By1_Goat_Diversion\60119211_By1_Vantage1_11x17_10Apr07.mxd

PERSPECTIVE



PLAN



VIEWSHED

Imagery extracted from Google Earth Pro,
associated providers Province of British Columbia,
Cnes/Spot Image, TeleAtlas and TerraMetrics, 2010.
Image date March, 2004. All other data, BC Hydro, 2010.

Legend

- Toby Creek Diversion Boundary
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- Contour (Index 100m)
- Contour (Interm. 20m)

BC Transmission CORPORATION

CVT Toby Creek Diversion

Vantage Point #2 - Viewshed

April 2010

AECOM

Figure 5-2

Project:
Prepared by: MM
Date Revised: April 9, 2010
File Location: E:\GIS\GIS_proj\Y2010\60119211_CVT_BCTC\By1_Goat_Diversion\60119211_By1_Vantage2_11x17_10Apr07.mxd

Vantage point #3 and the viewshed associated with it are shown in Figure 5-3. This viewshed is located north of Toby Creek Road in the north-south swath of the Toby Creek Diversion (562285E, 5595202N). The view shown in this figure was centred at a bearing of 171 degrees, at an elevation of 1065 m. Although this is a relatively exposed area at this section of the route, the natural tree cover and lack of vantage points outside of the study area makes this low in visual sensitivity.

5.1.3 Socio-Economic/Community

The nearest communities to the Toby Creek Diversion are Athalmer (unincorporated) and the District Municipality of Invermere, which together had a population of 3002 in 2006. Both are located to the east of the Toby Creek Diversion. Panorama Mountain Village (ski resort) is located to the west of the study area and is the closest major destination in that direction. Invermere remains the primary service center for community, emergency and retail services south of Golden and Radium Hot Springs.

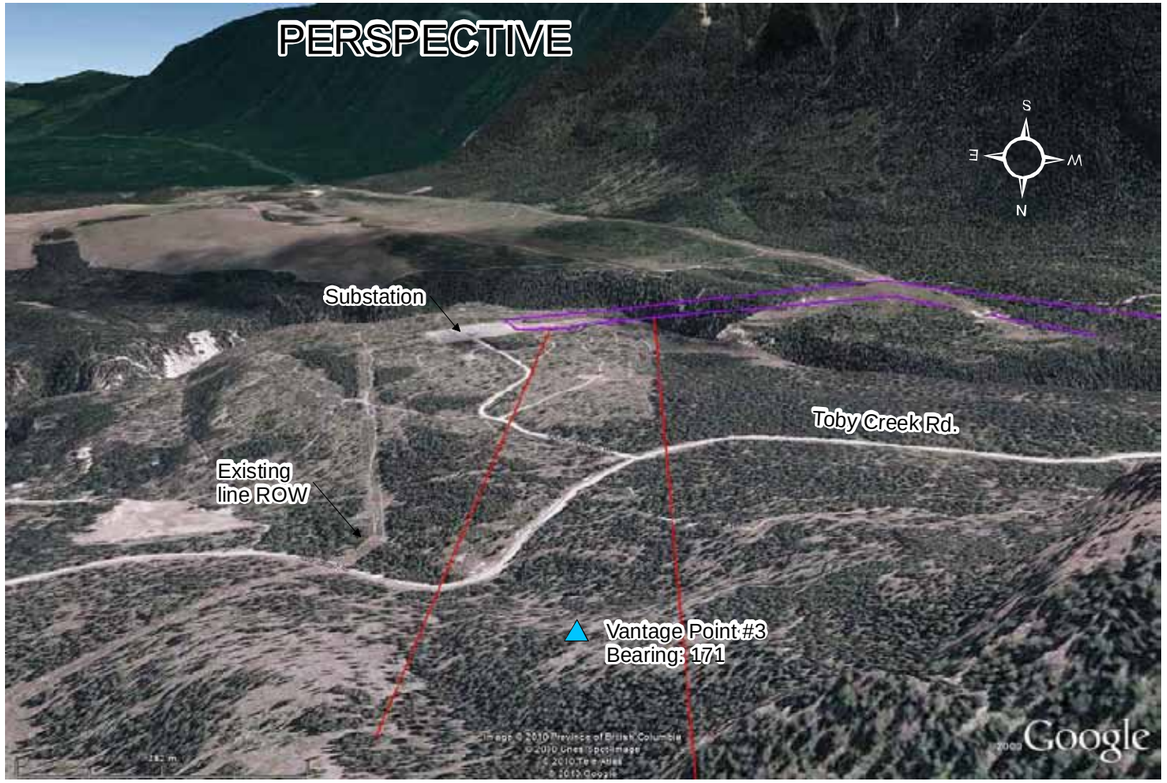
There are no changes of significance to the results identified in the main report concerning socio-economic or community values. The Toby Creek Diversion would not change or impact the local or regional demographics to a greater or lesser extent than the alternative line options.

5.2 Effects Assessment

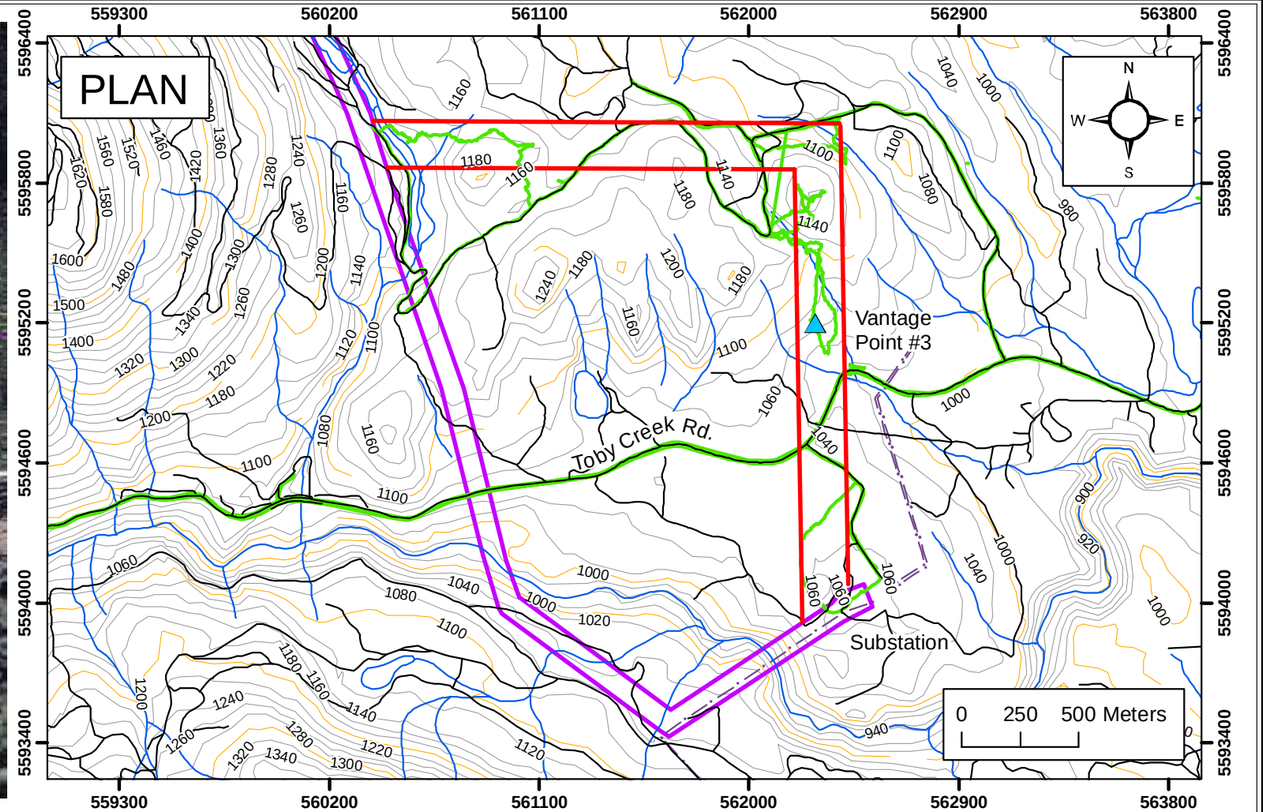
Given the distance from nearby communities, the proposed Toby Creek Diversion route will not be seen from Invermere and will be visible mainly to recreational users and residents living near the study area. It will also be visible to those passing through the area via Toby Creek Road at the southern extent. Following a viewshed assessment, the knoll area in the northeast corner of the study area is the only concern for moderate visual impact given its proposed location at high elevation. Avoiding a direct heading to the top of the knoll (near Vantage point #1) would reduce the overall visual impact of the route option from *moderate* to *low* in this specific area.

From a land-use perspective, there are no significant changes to the recommended mitigation measures identified in the main report for this section of the proposed line. The impact remains low based on the existing use of this area and following the general land use/aesthetics recommendations made in the main report.

PERSPECTIVE



PLAN



VIEWSHED

Imagery extracted from Google Earth Pro,
associated providers Province of British Columbia,
Cnes/Spot Image, TeleAtlas and TerraMetrics, 2010.
Image date March, 2004. All other data, BC Hydro, 2010.

Legend

- Toby Creek Diversion Boundary
- Trails and Roads
- Tracks (Mar 31, Apr 1)
- Watercourse
- Potential Corridor
- Existing Line
- Contour (Index 100m)
- Contour (Interm. 20m)

BC Transmission CORPORATION

CVT Toby Creek Diversion

Vantage Point #3 - Viewshed

April 2010

AECOM

Figure 5-3

Project:
Prepared by: MM
Date Revised: April 9, 2010
File Location: E:\GIS\GIS_proj\V2010\60119211_CVT_BCTC\By1_Goat_Diversion\60119211_By1_Vantage3_11x17_10Apr07.mxd

6. Potential Project Effects Summary

Table 6-1 below summarizes the results of the Toby Creek Diversion environmental overview assessment. It is concluded that this corridor option is not likely to result in significant adverse environmental effects, provided that the mitigation measures summarized in Table 6-1 are taken into account and that BCTC develops a Construction EMP (as described in Section 2.5.3 and further in Section 10.2.1 of the main report) once a final alignment is known and before construction begins.

Table 6-1. Potential Impacts and Recommended Mitigation Measures

Valued Component	Key Results	Mitigation Measures	Residual Effect Rating
Multiple Components	Potential impacts to : • Sensitive ecosystems and habitat suited to wildlife and plant species at risk (including riparian areas).	1) When feasible, the alignment should follow clearcuts and clearings (e.g., <40 years in age) and use existing road sections for access.	Low
Fish and Fish Habitat	No impact as no creek in area	N/A	N/A
Wildlife and Wildlife Habitat	Potential impacts to species at risk. It is likely that several other species at risk are also in the area even though they were not detected during field reconnaissance work.	2) Avoid placement of transmission line poles/structures, new substation and access trails in wetlands, open ponds, and riparian areas to the greatest extent feasible. 3) If construction must occur in wetlands, use silt fencing and salvage amphibians and turtles from affected areas. 4) Minimize additional removal of old age class forest where possible and practical. 5) Avoid clearing of vegetation during the bird breeding / nesting season (generally May to August) wherever feasible. If clearing must take place during the breeding season, it is recommended that nest surveys are completed prior to construction and that appropriate set-back buffers for disturbance are applied according to provincial BMP guidelines where nests are identified.	Low
Vegetation	Potential impacts to sensitive ecosystems and rare plant species within the study area.	6) Follow standard access construction practices to mitigate impacts to fish and fish habitat. 7) Avoid placement of transmission line poles/structures, new substation and access trails in wetlands, open ponds, and riparian areas to the greatest extent feasible. 8) Minimize additional removal of old age class forest where possible and practical. 9) Have a qualified professional conduct a detailed assessment of rare plants and sensitive ecosystems along the route once the final alignment has been selected.	Low
	Potential introduction or spread of invasive plant species in the area.	10) Follow standard best management practices for controlling invasive species during construction and operation of the Project (outlined in Appendix C-6 of the main report). 11) Avoid the use of traditional seed mixes for reclamation of access trails; native seed should be used where feasible.	Low
Aesthetics	Potential visual impact to northeast corner of study area on elevated knoll. This is a moderately exposed area along the proposed route.	12) Where feasible, avoid direct line route to top of the northeast knoll and consider shifting direction to the west side of the knoll before connecting with the east-west portion of the proposed route. Consider avoiding the knoll, if possible, during final alignment of the 230kV transmission line.	

7. References

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Appendix A

November Field Report – Toby Creek Diversion

Appendix A March/April Field Report – Toby Creek Diversion

Overview

As a part of the Environmental Assessment Overview for the proposed Toby Creek Diversion field assessment was conducted on March 31 and April 1, 2010. The objectives of field survey were as follows:

- to assess the potential for species at risk (SAR), including both wildlife and plants, within the proposed re-alignment area;
- to identify the potential for sensitive ecosystems within the re-alignment area;
- to any identify, at a reconnaissance level, high value habitats for potentially occurring SAR or other species of concern; and
- to identify viewshed concerns and visual impact at various locations along the re-alignment area.

Methodology

The field assessment of the proposed Toby Creek Diversion, was conducted by Jennifer Sarchuk (AECOM) and Mike Morellato on March 31 and April 1, 2010. The level of detail of this survey was kept as an overview as the weather conditions at this time of year was not conducive to a full-fledged field program. Field assessments included looking at areas of interest such as high value habitats and ecosystems – wetlands and rocky outcrops.

To assess aesthetics/visual impact, the field team stopped at regular intervals and documented viewsheds at any obvious vantage points/exposed areas. The direction of the photograph from vantage points within the study area were marked with a compass bearing, with horizontal swath and visual impact also noted. For viewshed assessment outside the study area, a GIS analysis was conducted, focusing on main access roads as vantage points.

A hand-held GPS was used to track the area walked and to mark the location of any points of interest or concern. Surveyors also took numerous photos of the study area and areas of concern during the flight.

Results of Assessment

Survey conditions for the ground assessments were considered good except for the time of year with scattered cloud, little wind, no precipitation and temperatures around 5°C. During the ground assessments, some observations relating to wildlife, wildlife habitats, potential for rare plants and viewshed concerns were made. These include:

- a possible ground squirrel digging was observed near the substation;
- various animal trails were found throughout the study area;
- a grass nest (likely a squirrel or chipmunk tree nest) was located in a lodgepole pine tree (*Pinus contorta)* on the west/east corridor of the Toby Creek Diversion;
- several signs of deer including scat and hair were noted throughout the study area;
- a rocky outcrop was noted on the high knoll near the 90° bend in the re-alignment;
- a wetland was noted at the most westerly end of the re-alignment;
- viewshed and aesthetics concerns were mainly limited to the northeast corner of the study area; the route is planned to pass over one of the highest knolls in the north-south corridor which is an area of increased visual exposure.

Appendix B

Provincially Red or Blue-Listed Plant Species Potentially found in the Biogeoclimatic Subzones of the Proposed Toby Creek Diversion

Appendix B Provincially Red or Blue-Listed Plant Species Potentially found in the Biogeoclimatic Subzones of the Proposed Toby Creek Diversion

Note: the following table are reproduced from AECOM 2009.

Table B-1. Provincially Red or Blue-Listed Plant Species associated with the IDFdm2 Biogeoclimatic Subzone

Scientific Name	English Name	BC Status	Habitat Type
Eleocharis rostellata	beaked spike-rush	Blue	Estuarine;Lacustrine;Palustrine;Riverine;Terrestrial
Potamogeton strictifolius	stiff-leaved pondweed	Blue	Lacustrine
Megalodonta beckii var. *beckii*	water marigold	Blue	Lacustrine;Palustrine;Riverine
Muhlenbergia glomerata	marsh muhly	Blue	Lacustrine;Palustrine;Riverine;Terrestrial
Sphenopholis intermedia	slender wedgegrass	Blue	Lacustrine;Palustrine;Riverine;Terrestrial
Carex sychnocephala	many-headed sedge	Blue	Lacustrine;Palustrine;Terrestrial
Glycyrrhiza lepidota	wild licorice	Blue	Lacustrine;Palustrine;Terrestrial
Hypericum scouleri ssp. *nortoniae*	western St. John's-wort	Blue	Lacustrine;Palustrine;Terrestrial
Salix boothii	Booth's willow	Blue	Lacustrine;Palustrine;Terrestrial
Stuckenia vaginata	sheathing pondweed	Blue	Lacustrine;Riverine
Carex rostrata	swollen beaked sedge	Blue	Palustrine
Heterocodon rariflorum	heterocodon	Blue	Palustrine;Riverine;Terrestrial
Linanthus septentrionalis	northern linanthus	Blue	Palustrine;Riverine;Terrestrial
Plantago eriopoda	alkali plantain	Blue	Palustrine;Riverine;Terrestrial
Stellaria obtusa	blunt-sepaled starwort	Blue	Palustrine;Riverine;Terrestrial
Anemone canadensis	Canada anemone	Blue	Palustrine;Terrestrial
Arnica chamissonis ssp. *incana*	meadow arnica	Blue	Palustrine;Terrestrial
Cryptantha ambigua	obscure cryptantha	Blue	Palustrine;Terrestrial
Impatiens ecalcarata	spurless touch-me-not	Blue	Palustrine;Terrestrial
Lomatium sandbergii	Sandberg's desert-parsley	Blue	Palustrine;Terrestrial
Sporobolus compositus var. *compositus*	rough dropseed	Blue	Palustrine;Terrestrial
Thalictrum dasycarpum	purple meadowrue	Blue	Palustrine;Terrestrial
Apocynum x *floribundum*	western dogbane	Blue	Terrestrial
Calamagrostis montanensis	plains reedgrass	Blue	Terrestrial
Carex geyeri	elk sedge	Blue	Terrestrial
Delphinium bicolor ssp. *bicolor*	Montana larkspur	Blue	Terrestrial
Gentiana affinis	prairie gentian	Blue	Terrestrial
Pellaea gastonyi	Gastony's cliff-brake	Blue	Terrestrial
Physaria didymocarpa var. *didymocarpa*	common twinpod	Blue	Terrestrial
Castilleja gracillima	slender paintbrush	Blue	
Epipactis gigantea	giant helleborine	Blue	
Pinus albicaulis	whitebark pine	Blue	
Veronica catenata	pink water speedwell	Red	Lacustrine;Palustrine;Riverine
Castilleja minor ssp. *minor*	annual paintbrush	Red	Lacustrine;Palustrine;Riverine;Terrestrial
Sphenopholis obtusata	prairie wedgegrass	Red	Lacustrine;Palustrine;Riverine;Terrestrial
Scolochloa festucacea	rivergrass	Red	Lacustrine;Palustrine;Terrestrial
Mimulus breviflorus	short-flowered monkey-flower	Red	Palustrine;Riverine;Terrestrial
Muhlenbergia andina	foxtail muhly	Red	Palustrine;Riverine;Terrestrial
Scirpus pallidus	pale bulrush	Red	Palustrine;Riverine;Terrestrial
Trifolium cyathiferum	cup clover	Red	Palustrine;Riverine;Terrestrial
Carex crawei	Crawe's sedge	Red	Palustrine;Terrestrial
Helianthus nuttallii var. *nuttallii*	Nuttall's sunflower	Red	Palustrine;Terrestrial
Solidago gigantea ssp. *serotina*	smooth goldenrod	Red	Palustrine;Terrestrial
Schizachyrium scoparium	little bluestem	Red	Riverine;Terrestrial
Arabidopsis salsuginea	saltwater cress	Red	Terrestrial

Scientific Name	English Name	BC Status	Habitat Type
Aster ascendens	long-leaved aster	Red	Terrestrial
Atriplex argentea ssp. *argentea*	silvery orache	Red	Terrestrial
Bouteloua gracilis	blue grama	Red	Terrestrial
Chenopodium atrovirens	dark lamb's-quarters	Red	Terrestrial
Cirsium scariosum	elk thistle	Red	Terrestrial
Gaura coccinea	scarlet gaura	Red	Terrestrial
Gayophytum racemosum	racemed groundsmoke	Red	Terrestrial
Gayophytum ramosissimum	hairstem groundsmoke	Red	Terrestrial
Hedeoma hispida	mock-pennyroyal	Red	Terrestrial
Lathyrus bijugatus	pinewood peavine	Red	Terrestrial
Lepidium densiflorum var. *pubicarpum*	prairie pepper-grass	Red	Terrestrial
Lomatium triternatum ssp. *platycarpum*	nine-leaved desert-parsley	Red	Terrestrial
Lupinus arbustus ssp. *neolaxiflorus*	spurred lupine	Red	Terrestrial
Lupinus arbustus ssp. *pseudoparviflorus*	Montana lupine	Red	Terrestrial
Orobanche ludoviciana ssp. *ludoviciana*	Suksdorf's broomrape	Red	Terrestrial
Thermopsis rhombifolia	prairie golden bean	Red	Terrestrial
Townsendia hookeri	Hooker's townsendia	Red	Terrestrial
Pterygoneurum kozlovii	alkaline wing-nerved moss	Red	

Appendix C

Provincially Red or Blue-Listed Wildlife Species Potentially found within the Biogeoclimatic Subzones of the Proposed Toby Creek Diversion

Appendix C Provincially Red or Blue-Listed Wildlife Species Potentially found within the Biogeoclimatic Subzones of the Proposed Toby Creek Diversion

Scientific Name	English Name	BC CDC[1]	COSEWIC[2]	Identified Wildlife[3]	In Corridor Option Area[4]
Mammals					
Corynorhinus townsendii	Townsend's Big-eared Bat	Blue	-	-	Unknown
Gulo gulo luscus	Wolverine, *luscus* subspecies	Blue	Special Concern	Yes	Unknown
Martes pennanti	Fisher	Blue	-	Yes	Unknown
Ovis canadensis	Bighorn Sheep	Blue	-	Yes	Unknown
Taxidea taxus	Badger	Red	Endangered	Yes	Likely
Ursus arctos	Grizzly Bear	Blue	Special Concern	Yes	Unknown
Birds					
Ammodramus leconteii	Le Conte's Sparrow	Blue	-	-	Unknown
Ardea herodias herodias	Great Blue heron, *herodias* subspecies	Blue	-	Yes	Unlikely
Asio flammeus	Short-eared Owl	Blue	Special Concern	Yes	Unknown
Athene cunicularia	Burrowing Owl	Red	Endangered	Yes	Unlikely
Botaurus lentiginosus	American Bittern	Blue	-	-	Unlikely
Buteo lagopus	Rough-legged Hawk	Blue	Not at Risk	-	Unknown
Buteo platypterus	Broad-winged Hawk	Blue	-	-	Unknown
Contopus cooperi	Olive-sided Flycatcher	Blue	Threatened	-	Unknown
Cygnus columbianus	Tundra Swan	Blue	-	-	Unlikely
Dolichonyx oryzivorus	Bobolink	Blue	-	-	Unknown
Grus canadensis	Sandhill Crane	Yellow	Not at Risk	Yes	Unlikely
Hirundo rustica	Barn Swallow	Blue	-	-	Unknown
Melanerpes lewis	Lewis's Woodpecker	Red	Special Concern	Yes	Likely
Numenius americanus	Long-billed Curlew	Blue	Special Concern	Yes	Unlikely
Otus flammeolus	Flammulated Owl	Blue	Special Concern	Yes	Likely
Sphyrapicus thyroideus nataliae	Williamson's sapsucker, *nataliae* subspecies	Red	Endangered	Yes	Likely
Spizella breweri breweri	Brewer's Sparrow, *breweri* subspecies	Red	-	Yes	Unknown
Tympanuchus phasianellus columbianus	Sharp-tailed Grouse, *columbianus* subspecies	Blue	-	Yes	Unlikely
Aechmophorus occidentalis	Western Grebe	Red	-	Yes	Unlikely
Buteo swainsoni	Swainson's Hawk	Red	-	Yes	Likely
Hydroprogne caspia	Caspian Tern	Blue	-	-	Unlikely
Nycticorax nycticorax	Black-crowned Night-heron	Red	-	-	Unlikely
Buteo lagopus	Rough-legged Hawk	Blue	-	-	Likely
Amphibians/Reptiles					
Ascaphus montanus	Rocky Mountain Tailed Frog	Red	Endangered	Yes	Unlikely
Chrysemys picta pop. 2	Western Painted Turtle - Intermountain - Rocky Mountain Population	Blue	Special Concern	-	Unlikely
Plethodon idahoensis	Coeur d'Alene Salamander	Yellow	Special Concern	Yes	Unknown
Rana pipiens	Northern Leopard Frog	Red	Endangered	Yes	Unlikely
Bufo boreas	Western Toad	Yellow	Special Concern		Likely
Spea intermontana	Great Basin Spadefoot	Blue	Threatened	Yes	Unknown
Charina bottae	Rubber Boa	Yellow	Special Concern	-	Unknown
Invertebrates - Butterflies (Order Lepidoptera)					
Anguispira kochi	Albert's Fritillary	Blue	-	-	Likely
Argia vivida	Rockslide Checkerspot	Blue	-	-	Likely
Boloria alberta	Monarch	Blue	Special Concern	-	Likely
Chlosyne whitneyi	Silver-spotted Skipper, *clarus* subspecies	Blue	-	-	Likely
Cryptomastix mullani	Nevada Skipper	Blue	-	-	Likely
Danaus plexippus	Dione Copper	Red	-	-	Likely
Epargyreus clarus clarus	Jutta Arctic, *chermocki* subspecies	Blue	-	-	Likely

Scientific Name	English Name	BC CDC[1]	COSEWIC[2]	Identified [3] Wildlife	In Corridor Option Area[4]
Gastrocopta holzingeri	Old World Swallowtail, *dodi* subspecies	Red	-	-	Likely
Gomphus graslinellus	Tawny-edged Skipper, *themistocles* subspecies	Blue	-	-	Likely
Hemphillia camelus	Checkered Skipper	Blue	-	-	Likely
Hesperia nevada	Aphrodite Fritillary, *whitehousei* subspecies	Blue	-	-	Likely
Libellula pulchella	Zerene Fritillary, *garretti* subspecies	Blue	-	-	Likely
Invertebrates - Dragonflies and Damselflies (Order Odonata)					
Lycaena dione	Vivid Dancer	Red	-	-	Likely
Magnipelta mycophaga	Pronghorn Clubtail	Blue	-	-	Likely
Oeneis jutta chermocki	Twelve-spotted Skimmer	Blue	-	-	Likely
Invertebrates - Aquatic and Terrestrial Gastropods (various Orders)					
Oreohelix strigosa	Banded Tigersnail	Blue	-	-	Unlikely
Oreohelix subrudis	Coeur d'Alene Oregonian	Blue	-	-	Unlikely
Papilio machaon dodi	Lambda Snaggletooth	Blue	-	-	Unlikely
Polites themistocles themistocles	Pale Jumping-slug	Blue	-	-	Unlikely
Pyrgus communis	Magnum Mantleslug	Blue	-	-	Unlikely
Speyeria aphrodite whitehousei	Rocky Mountainsnail	Blue	-	-	Unknown
Speyeria zerene garretti	Subalpine Mountainsnail	Blue	-	-	Unknown
Vallonia cyclophorella	Silky Vallonia	Blue	-	-	Unknown

[1] *BC CDC Rankings: Red = Extirpated (no longer exist in area), Endangered (facing imminent extirpation/extinction) or Threatened (likely to become endangered if not reversed); Blue = Special Concern (at risk, but not Red); Yellow = Not at Risk.*

[2] *COSEWIC Rankings: Endangered = facing imminent extirpation or extinction; Threatened = likely to become endangered if no management occurs; Special Concern = may become Threatened due to biological or other factors.*

[3] *Identified Wildlife: Species has status under the Identified Wildlife Management Strategy and eligible for designation of General Wildlife Measures or Wildlife Habitat Areas.*

[4] *In Study Area: Yes = evidence of recent use in reviewed report; Historic = evidence of historic use (< 20 years ago) in reviewed report; Likely = available surveys indicate within the WRA and suitable habitat available in study area; Unknown = no current evidence of use, but there is uncertainty due to lack of or intensity of available surveys; Unlikely = available surveys sufficiently rigid to indicate that species is not likely present or habitats not within study area.*

Appendix D

Vegetation and Wildlife-Related Photos of Toby Creek Diversion

Appendix D Vegetation and Wildlife-Related Photos of the Toby Creek Diversion

Photograph 1
Habitat near substation to the North, March 31, 2010.

Photograph 2
Possible ground squirrel digging near Invermere substation to the North, March 31, 2010.

Photograph 3
Probably a flicker nest near Invermere substation to the North, March 31, 2010.

Photograph 4
Gully at the base of high knoll facing Southwest, March 31, 2010

Photograph 5
Rocky outcrop on high knoll at 90° bend of proposed Toby Creek Diversion, March 31, 2010.

Photograph 6
Possibly a squirrel or chipmunk tree nest located in a Lodgepole pine tree on the western half of the east/west section of the diversion, April 1, 2010.

Photograph 7
Habitat near another knoll on east/west section of diversion, April 1, 2010.

Photograph 8
Wildlife trail near wetland on east/west section of diversion, April 1, 2010.

Photograph 9 ↑
Vertebra of large cervid or cattle near wetland on east/west section of diversion, April 1, 2010.

Photograph 10 ↑
Wetland near westerly point on east/west section of diversion, April 1, 2010.

Photograph 11 ↑
Pileated woodpecker feeding holes on ant colonies located near wetland on east/west section of diversion, April 1, 2010.

Photograph 12 ↑
Habitat (rocky outcrop) near wetland on east/west section of diversion, April 1, 2010.

Photograph 13 ↑
Habitat south of the high knoll looking upslope (Slope = 33°), April 1, 2010.

Photograph 14 ↑
Habitat South of high knoll, April 1, 2010.

Photograph 15 ↑
Open grass habitat South of high knoll, April 1, 2010.

Photograph 16 ↑
White-tailed deer fur near south of previous photo, April 1, 2010.

Photograph 17 ↑
Habitat 100 m Northwest of Toby Creek Road, April 1, 2010.

Photograph 18 ↑
Lots of Douglas-fir seedlings planted near 90° bend on North side of high knoll on east/west section of diversion, April 1, 2010.

Appendix C

Summary of Input Received Through Public Consultation on the Toby Creek Diversion

Appendix C
Summary of Input Received Through Public Consultation on the Toby Creek Diversion

	Concern/Comment	**BCTC's Response**
1	Concern that the transmission line will be visible from Lake Lillian, the climbing areas and the Toby Benches. Request to build the line in an existing gully to minimize impacts on visuals, site lines.	The final alignment for the proposed transmission line is yet to be determined. BCTC will make use of existing topography, where feasible, to minimize the visual effects of the transmission line. Further engineering studies and detailed mapping is required to confirm the alignment.
2	Request to minimize clearing	To minimize clearing, where feasible BCTC will try to route the final alignment through existing cut-blocks.
3	Request to minimize noxious weed spread	BCTC will work with Ministry of Environment and local committees to address concerns regarding invasive weeds on the right-of-way.
4	Noted that mineral soil disturbances should be stabilized and seeded with an acceptable seed mix for the area	Potential for erosion on the right-of-way will be addressed in the construction Environmental Management Plan. Standard approved mitigation measures will be applied to mitigate any possible erosion.
5	Noted that tenure holders should be consulted	All tenure holders along the proposed diversion route were consulted.
6	Request that an access plan be in place to deal with type and term of vehicle use and recommendation for a signage system	BCTC will cooperate with regulatory agencies in any effort they may make to manage access over transmission rights-of-way in the area.
7	Noted that work must be in compliance with the *Wildfire Act* and *Regulations*	BCTC acknowledges that the work must be in compliance with the *Wildfire Act* and associated regulations.
8	Noted that permits will be required for cutting timber, road access and burning of debris	See response to #7. BCTC will apply for required permits during the implementation phase of the Project.
9	Noted that a timber mark will be needed to move wood off of the site	See response to #8.

	Concern/Comment	BCTC's Response
10	Noted that the *Heritage Conservation Act* must be complied with regarding archaeological impacts	BCTC will conduct a detailed Archaeological Impact Assessment (AIA) study for the Project and if required, any related permits, in compliance with the *Heritage Conservation Act.*
11	Requested an explanation why the new line can't follow the existing 69 kV transmission line from Invermere Substation to Toby Creek Road	The layout of the existing Invermere substation is east-west, where east side is the 69 kV and 25 kV switchyards and the west side is the 230 kV switchyard. The proposed 230 kV transmission line will originate from the west side of the substation and head north. To follow the 69 kV transmission lines, the new line would have to traverse across the Invermere substation. Additional dead-end structures would be required and any expansion options at the substation in the future would be limited. Also, adding an additional transmission line along existing 69 kV transmission lines requires additional right-of-way from Invermere Substation to Toby Creek Road and would likely increase visual impacts.
12	Request that the new transmission line be built to the eastern edge of the corridor	The final alignment for the transmission line is yet to be determined. Further engineering studies and detailed mapping is required to confirm the alignment. BCTC will ensure that clearing for the new right-of-way will not be done on adjacent private properties.
13	Request that the new ROW does not improve access to an existing east/west track to Barbour Lake; and that BCTC maintain a treed buffer between the track and the alignment clearing	BCTC will not interfere with existing access control measures in the vicinity of the project. See response to #6.
14	Suggested that BCTC create 3-D viewscapes for public review	BCTC had artists renderings developed for the transmission line and substations and presented these to the public at community open houses in 2009 (see Appendix P of the Application). These renderings are representative of the appearance of the Toby Creek Diversion.

	Concern/Comment	BCTC's Response
15	Noted that property owners adjacent to the proposed corridor should have an opportunity to provide comment.	BCTC has contacted all property owners adjacent to the Toby Creek Diversion route.
16	Noted preference for BCTC to build the transmission lines over existing roads or trails rather than forest	The final alignment for the transmission line is yet to be determined. Further engineering studies and detailed mapping is required to confirm the alignment.